

**Recent Initiatives to Improve Delta Water Use Data
for Informed Management
Office of the Delta Watermaster
May 2022**

The Office of the Delta Watermaster (ODWM), in collaboration with the Division of Water Rights (Division) and water managers throughout the Delta, works to enhance water data quality, timeliness, credibility and analysis to administer water rights effectively and lawfully within the Legal Delta. Having such enhanced data is critical to understanding the exercise of water rights and claims within California's complex water rights system. Better data reduces conflict, protects the priority of allocations, and assures the efficient use of water. Because California relies heavily on diverter-reported use data, improvement includes assisting diverters in understanding and meeting their reporting responsibilities. ODWM also strives to improve the credibility, transparency, and accessibility of water use data. Among our recent and current initiatives:

1. Analyzing Responses to the 2015 Informational Order¹

- a. Large diverters in the Legal Delta filed responses to the Division's Order during the last multi-year drought. Thereafter, the State Water Board developed protocols for reviewing these user-verified submissions.² Following those protocols, staff categorized water rights and claims, developed a spreadsheet summary of all submissions, and published the summary—along with a request for possible corrections—on our websites.³
- b. The response review protocol ultimately led to creation of a unified, online data base capturing virtually all patents and surveys related to the reclamation of the Delta in the late Nineteenth and early Twentieth Centuries.⁴ The patents evidencing the transactions by which title to Delta properties (and their accompanying water rights) were transferred from public to private ownership are an important resource for understanding the nature and priority of most Delta water rights.
- c. As staff resources and budget authority permitted, ODWM verified and incorporated corrections and clarifications of the spreadsheet entries for the Legal Delta proposed by respondents or identified through further research.

¹ State Water Resources Control Board Order WR 2015-0002-DWR is available at:

http://www.waterboards.ca.gov/waterrights/water_issues/programs/drought/docs/2015sacsjinfforder.pdf

² The Protocol for Informational Order responses is **available at:**

³ Cover memo is available at:

https://www.waterboards.ca.gov/water_issues/programs/delta_watermaster/docs/20180215_cvr_memo_dwr_info_order_spreadsheet.pdf

⁴ The 2015 Informational Order Document Repository is at: <https://ftp.waterboards.ca.gov>, Username: IORR-FTP, Password: AccessIORR

- d. Recognizing that State Water Board staff does not validate water right claims,⁵ the assembled and digitized materials (original responses, patents and surveys, and summary spreadsheet with categorization of staff's estimates of reliability) represent the most comprehensive catalogue of Delta water rights and claims ever compiled. This catalogue, still undergoing "crowd correction" and verification, is the first place to look when researching the historical and legal bases for large Delta diversions.

2. Prioritizing Constituent Outreach, Communication and Assistance

- a. Reviewing both the large number of Informational Order responses and the annual reports of water diversion and use revealed widespread misunderstanding and resulting misreporting about the exercise of water rights within the Legal Delta. Consequently, ODWM embarked on a comprehensive effort aimed at improving the quality of water use reports.
- b. Beginning in 2018, ODWM has designated one full-time position as its Communication & Outreach Specialist.⁶ This senior administrator acts as the ODWM's initial point of contact with responsibility to directly and promptly address or appropriately refer all constituent inquiries. As such, the position provides an accessible, user-friendly, real-time "access port" to explain procedures, provide access to information, review proposed submissions, and—importantly—recognize trends in constituent needs.
- c. Compared to an automated voice message or generic email box, ODWM has found that dedication of this experienced staffing resource has reduced constituent frustration, improved the quality and consistency of water use reports, and provided triage capability, which, taken together, conserve resources within ODWM.

3. Clarifying the Terms and Conditions of Water Rights and Claims

- a. To address one of the most common misconceptions about Delta water rights, ODWM undertook a year-long legal research project to differentiate between pre-1914 and riparian water rights. The effort culminated in a memorandum of law: "Issues Related to Overlap between Pre-1914 and Riparian Water Right Claims in the Delta," more colloquially referred to simply as the Overlap Memo.⁷

⁵ Pre-1914 and riparian claims, for instance, remain "claims" until adjudicated by the courts. See provisions for statutory adjudications at Water Code §§2500-2868.

⁶ The Duty Statement is at:

https://www.waterboards.ca.gov/water_issues/programs/delta_watermaster/docs/ssm1dutystmnt.pdf.

The incumbent is Kristi Matal, kristi.matal@waterboards.ca.gov; (916) 319-8264.

⁷ Available at: [Memo Regarding Claimed Overlap Between Riparian and Pre-1914 Water Rights in the Delta and Frequently Asked Questions](#)

- b. Prior to being finalized in late 2017, the Overlap Memo was refined in rounds of internal review by the Division, the Office of Enforcement, and the Office of Chief Counsel. It was also subjected to further review and refinement through a formal reference to the Attorney General.
- c. The Overlap Memo has been posted on the ODWM website since early 2018 and publicly articulates the legal reasoning on which ODWM differentiates purported “overlapping” water right claims in the Delta. Many Delta diverters continue to follow their lawyers’ advice to claim every conceivable basis of water right.⁸ Nonetheless, the conclusions of the Overlap Memo have yet to be directly challenged.

4. Implementing Water Measurement Regulations

- a. In 2015, California enacted budget trailer bill SB 88⁹ requiring diverters of ten acre-feet or more of water annually to measure their diversions. The new law was implemented through emergency regulations adopted by the State Water Board in 2016.¹⁰
- b. The implementing regulations require measurement at specified accuracy standards.¹¹ While there was widespread skepticism regarding the practicality of meeting the regulatory accuracy standard within the Legal Delta, many diverters conscientiously pursued strict compliance.¹²
- c. By the fall of 2016, based on challenges encountered in early installations, ODWM convened a series of informal meetings among diverters to address common challenges and causes of failure. Ultimately, the value of collaboration on common challenges led to an *ad hoc*, voluntary, but rigorous experimentation process which came to be known as the Delta Measurement Experimentation Consortium (Consortium).¹³
- d. Through the Consortium’s work and the evidence collected throughout the experimentation, ODWM reached the conclusion that many diversions in

⁸ It remains common for water use reports to claim multiple and even inconsistent bases for diversion. A partial “laundry list” includes contracted, permitted, licensed, pre-1914, riparian, overlying, conservation, salvage, and artesian bases of support for diversion and beneficial use of water. Though often amusing in range and creativity, such varied claims are not frivolous. Lawyers point out that, until the Delta watershed bases of right are comprehensively and consistently adjudicated, it makes sense for diverters to assert and thereby preserve every colorable legal basis for their diversions.

⁹ Water Code §1840 et seq.

¹⁰ 23 California Code of Regulations (CCR) §931 et. seq.

¹¹ 23 CCR §933(d).

¹² The Department of Water Resources (DWR) promptly installed roughly 50 Mace meters on its diversions on Sherman and Twitchell Islands in the western part of the Delta. The Nature Conservancy (TNC) also commenced a comprehensive installation program on Staten Island. Following its 2016 purchase of Bacon and Bouldin Islands and Holland and Webb Tracts (totaling more than 20,000 farmable acres in the central part of the Delta), the Metropolitan Water District of Southern California (Metropolitan) commenced a well-funded, long-term compliance process.

¹³ See https://www.waterboards.ca.gov/water_issues/programs/delta_watermaster/consortium.html

the Legal Delta face current, recurring—and possibly long-term—obstacles to strict compliance.¹⁴

- e. Based on these and additional challenges and unforeseen circumstances, and to foster further experimentation and collaboration, ODWM granted a series of broad but limited-term extensions of time to comply with the measurement regulations.^{15 16}

5. Supporting the Development of Cost-effective Calculation of Crop Evapotranspiration (ET)

- a. Frustrating challenges in measuring physical diversions in the Legal Delta have been partially offset by significant advances in calculating crop ET. Application of advancing science and computer analysis of satellite imagery are particularly promising in the Delta because:
 - i. the primary managed use of water is for crop irrigation;
 - ii. all diversions are for direct application to beneficial use, because there is no managed storage;
 - iii. runoff and tailwater from crop irrigation returns to the Delta channels in close proximity (in both time and location) to its POD;
 - iv. a significant but difficult-to-quantify portion of crop ET is passively diverted from the surface through seepage, not from diversion through syphons, pumps, and pipes; and
 - v. unquantified conveyance and distribution losses are relatively small and, in any case, tend to return to the surface water supply in the Delta.

¹⁴ Because the Delta is subject to tidal influence, the water stage (level) fluctuates at many points of diversion (PODs) by multiple feet, twice per day. These fluctuations inhibit consistent transducer monitoring of rates of diversion. Because many islands within the Delta have subsided below the surrounding water level, many diversions employ syphons rather than pumps to divert water onto their places of use (POUs). Syphons often exhibit internal turbulence that complicates and often defeats acoustic measurement. Because of invasive aquatic weeds and other debris in Delta channels, even screened diversions are subject to clogging and obstruction at a far higher rate than at PODs in upstream portions of the watershed. Such debris precludes the use of propeller meters in most circumstances and compromises insertion meters in many applications. Equipment exposed on the water side of levees in the Delta experience theft and vandalism associated with boat access, limited visibility, and sparse population. Instability and limited availability of power and cellular service significantly complicate collection and transmission of water use data, even when measuring equipment is operating properly.

¹⁵ Authority and conditions for such extensions are at 23 CCR §936.

¹⁶ As examples of recent extensions to allow ongoing attempts to reach strict compliance with the measurement regulation, see the two-year extension granted to Metropolitan Water District available at: https://www.waterboards.ca.gov/water_issues/programs/delta_watermaster/docs/mwd-approval-eot.pdf based on individual compliance plans for each of four islands in the Delta (the Bouldin Island plan is available here: https://www.waterboards.ca.gov/water_issues/programs/delta_watermaster/docs/final-plan-bouldin.pdf) and to the short-term extension to The Freshwater Trust available at: https://www.waterboards.ca.gov/water_issues/programs/delta_watermaster/docs/fresh-water-trust-approval-open-et.pdf

- b. ODWM, with the cooperation and important contributions of Delta water users, sponsored an initial research effort to calculate crop ET in the Delta in 2015.¹⁷
- c. Following the 2015 study, there was lingering uncertainty about the potential for conserving water by fallowing land within the Delta. To address that knowledge gap, ODWM collaborated with the State Water Contractors, the San Luis Delta Mendota Water Authority, and a group of farmers within the Delta to sponsor a more focused study. Thus, during the 2018 irrigation season, we contracted with researchers at UC Davis and at Land IQ to carry out the focused study.¹⁸
- d. Meanwhile, ODWM and the three Delta Water Agencies,¹⁹ proposed the Legal Delta as a use case to help inform development of OpenET.²⁰ ODWM and the Division assigned personnel to serve on both policy and technical committees overseeing OpenET's four-year development process. OpenET rolled out publicly in October of 2021.²¹
- e. The Consortium relies on OpenET as the calculation heart of the Delta Alternative Compliance Plan.²² Similarly, the Delta Dry-year Response Pilot Program (DDRPP)²³ uses OpenET (along with a ground-truthing, in-field, monitoring program under contract between DWR and UC Davis) to measure the consumptive use saving that may be derived from a suite of water conservation test actions being undertaken during the current water year (through September 30, 2022).

6. Applying Guidance from Relevant Cases

¹⁷ The report on the study is summarized at:

https://www.waterboards.ca.gov/water_issues/programs/delta_watermaster/crop_c_u_study.html

The summary further links to technical support resources.

¹⁸ The report on the 2018 Delta land fallowing study is at [\[link to final report\]](#).

¹⁹ The North, Central and South Delta Water Agencies are limited-purpose agencies authorized by statute and funded from assessment of lands within their respective boundaries encompassing most of the Legal Delta.

²⁰ The Delta Water Agencies also voluntarily contributed \$150,000 to the OpenET development budget (\$8.5 million), which was funded primarily by philanthropic foundations including the Walton Family Foundation, the Stephen D. Bechtel Foundation and the California Water Foundation. The development process was further supported by in-kind contributions from the National Aeronautics and Space Administration (NASA), the United States Department of Agriculture (USDA), the Desert Research Institute, Google Earth Engine, and several universities.

²¹ See the press release and related background materials at: <https://www.nasa.gov/image-feature/openet-a-satellite-based-water-data-resource>. Learn more about OpenET at: <https://openetdata.org/>

²² The Delta ACP, described in more detail at:

https://www.waterboards.ca.gov/water_issues/programs/delta_watermaster/docs/deltaacpfinal.pdf, is authorized pursuant to 23 CCR §935. By substituting OpenET's consistent calculation of crop consumptive use instead of inherently problematic meter measurements, the Delta ACP promises more timely, credible, and actionable water use data in the Legal Delta.

²³ Find information about DDRPP at: <http://deltaconservancy.ca.gov/grant-program/>

- a. *In the Matter of Administrative Liability Complaint Against Byron-Bethany Irrigation District*, SWRCB Order 2016-0015, June 7, 2016 [dismissing prosecution against diversion at a specific location in the Delta in purported contravention of an order of curtailment, because of unreliability of the underlying supply/demand methodology based on monthly timestep and watershed-wide scope].
- b. *Modesto Irrigation District v. Tanaka*, 48 Cal.App.5th 898 (2020) [providing guidance on evaluating the validity of riparian claims in the historical setting of the reclaimed Delta].
- c. *Stanford Vina Ranch Irrigation Company v. State of California*, 50 Cal.App.5th 976 (2020) [affirming the State Water Board's authority to adopt and enforce emergency regulations prohibiting the unreasonable diversion and use of water during a drought].

7. Updating Water Supply/Demand Estimates and Curtailment Methodologies

- a. Following the State Water Board's finding in 2016 that the Division's curtailment methodology was inadequate to support prosecution for unlawful diversion in the Byron-Bethany ID case, the Division has substantially refined what is now the Water Unavailability Methodology for the Delta Watershed (Curtailment Methodology).²⁴
- b. The Division, through a series of public workshops,²⁵ presentations, and feedback loops, continues to refine the Curtailment Methodology, its technical appendices, its query capabilities, and its visualization tools. Application of the Curtailment Methodology and the Division/ODWM's evaluation of dynamic watershed conditions currently inform weekly updates of persistent drought conditions and the resulting extent of curtailments in the Delta watershed.²⁶
- c. As with any complex decision support model, the Curtailment Methodology depends upon critical data inputs. In any given Delta tributary, data may come from a variety of the best available sources (though still of uneven consistency and reliability): diverter-generated user reports aggregated in the electronic Water Rights Information Management System (eWRIMS);²⁷ stream gages and other monitoring equipment, where they exist; weather forecasts provided by the National Oceanic and Atmospheric Administration (NOAA) and others; streamflow forecasts from DWR's Bulletin 120 and the California Nevada River

²⁴ See the description of the Curtailment Methodology at:

https://www.waterboards.ca.gov/drought/drought_tools_methods/delta_method.html

²⁵ See, e.g., the summary of recent refinements and notice of a workshop scheduled for May 12, 2022 available at: https://www.waterboards.ca.gov/drought/delta/docs/2022/051222_workshop_notice.pdf

²⁶ See the Division's Delta Drought webpage at: <https://www.waterboards.ca.gov/drought/delta/>

²⁷ The user reports are subjected to a quality control process that attempts to remove obvious errors.

Forecast Center (CNRFC); and estimates of likely water demand derived from experience in prior periods.

- d. The challenge of estimating water availability in the Legal Delta is compounded by the number and ranges of uncertainty associated with required data inputs.²⁸ That complexity has been further underscored by the investigation (which is ongoing) of a complaint alleging unlawful diversion in the Legal Delta, which was filed by the Friant Water Authority on June 10, 2021.²⁹

8. Tweaking the Water Use Reporting Process

- a. **Proposing Legislation to Consolidate Reporting Periods and Due Dates:** Through ODWM's communications with water users, it became apparent that different due dates for water use reports (Reports of Licensees due by April 1; Statements of Diversion and Use due by July 1) were inhibiting collaboration among filers. In addition, there were different reporting periods for different types of water rights. ODWM and the Division worked with the Office of Chief Counsel to develop legislation to consolidate water use report due dates and report periods and to provide an orderly transition. The changes were included in trailer bill SB 155.³⁰
- b. **Addressing Duplicative and Other Distortions in Water Use Reports:** ODWM also recognized the data-distorting effects of "duplicative reporting" in which the same water, often diverted through a common POD and put to beneficial use within the same POU, was reported in two (or more) distinct reports. As the water use was aggregated within eWRIMS it appeared that the Delta was taking an excessive volume of water from the system. In collaboration with Delta water users, ODWM is in the process of correcting the problem.³¹
- c. **Advancing Needed Clarification of Regulations:** ODWM and the Division are also collaborating on various "clean up" amendments to the State Water Board's regulations including conforming to the consolidated due dates and reporting period and clarifying the requirement to notify the

²⁸ See e.g., "Technical Appendix D: Assessment of Water Unavailability Issues Within the Legal Delta" at: https://www.waterboards.ca.gov/drought/drought_tools_methods/docs/wua_app_d_092721.pdf

²⁹ See the complaint at:

https://www.waterboards.ca.gov/water_issues/programs/delta_watermaster/docs/fwacomplaint.pdf

³⁰ For further information, see the explainer on ODWM's website at:

https://www.waterboards.ca.gov/water_issues/programs/delta_watermaster/docs/reportingduedates.pdf

³¹ For further details, see our Revised Consensus Strategy for Avoiding Duplicative Reporting of Water Diversion and Use in the Legal Delta on ODWM's website at:

https://www.waterboards.ca.gov/water_issues/programs/delta_watermaster/docs/revised-consensus.pdf

State Water Board when water rights are transferred from one owner to another.³²

9. Pursuing the Next Generation Water Rights Data Management System

The State Water Board has launched a new project called Updating Water Rights Data for California (UPWARD California) to improve the way the State collects and manages water rights data and information. California's water rights data include information on water use, demand, and when and how water is diverted from streams and rivers. This type of information is critical for data-driven water management decisions, particularly in the course of recurring droughts and floods. The State's current water rights data system (eWRIMS) is outdated; eWRIMS lacks features that would make reporting simpler and public access easier. UPWARD California will create a modern platform to help support California's long-term initiatives to improve water resilience in the face of ongoing climate change.³³

10. Taking Enforcement Actions as Necessary to Compel Compliance

- a. The primary objective of ODWM is to encourage water right compliance among diverters within the Legal Delta. However, when outreach, education, assistance, clarification, and encouragement prove insufficient, enforcement is required both in fairness to those who do comply and to ensure the integrity of the regulatory process. Among recent examples:
 - i. License Revocations: ODWM has taken action to revoke licenses for failure to observe terms and conditions and for failure to exercise.³⁴
 - ii. Imposition of Civil Liability: ODWM has imposed and collected civil penalties (fines) aggregating more than \$25,000 for failure to file required reports on a timely basis.³⁵
 - iii. Settlements: ODWM has resolved through settlement complaints of unlawful diversions within the Legal Delta.³⁶

³² The current working draft of a Notice of Proposed Rulemaking is available at: https://www.waterboards.ca.gov/water_issues/programs/delta_watermaster/docs/2022/notice-of-proposed-rulemaking-draft.pdf

³³ Project updates will be posted on the State Water Board's website at: <https://www.waterboards.ca.gov/upward/>

³⁴ Recent examples include: Lamb Gianelli Family LP Order Partially Revoking Water Right at: https://www.waterboards.ca.gov/waterrights/board_decisions/adopted_orders/orders/2019/wro2019_0034_dwm.pdf and Notice of Proposed Revocation of License 881B available at https://www.waterboards.ca.gov/water_issues/programs/delta_watermaster/docs/usacenoticeprol.pdf

³⁵ See e.g., https://www.waterboards.ca.gov/water_issues/programs/delta_watermaster/docs/2022/wro20220146.pdf

³⁶ See e.g., State Water Board Orders: https://www.waterboards.ca.gov/water_issues/programs/administrative_hearings_office/docs/2021/2021_01_28_order_wr_2021_0002_exec_ohm.pdf

11. Highlighting Gaps in Delta Data, Science and Understanding

- a. Collaborative Science Adaptive Management Program
- b. Delta Science Program
- c. Monitoring Special Studies
- d. Science Action Agenda
- e. Salinity and Restoration Workshops

12. Reducing Conflict through Collaboration, Planning and Investment

- a. Channel Maintenance Working Group
- b. Temporary Barriers Program
- c. Southern Delta Master Plan
- d. Unified Voice for Delta Water Stewards
- e. Grant Writing/Administration entity

13. Investigations of Water Rights

The ODWM and Division have undertaken investigations of water rights on specific islands in the Delta where there are confusing or contested claims of water rights. ODWM then met with the water rights holders or claimants and provided recommendations on how water rights or claims should be reported to the State Water Board moving forward. Areas investigated include Union and Roberts Islands, Pescadero Reclamation District, Holland Tract, McDonald Island, and Reclamation District 2068. Other such reviews are underway in additional areas.

https://www.waterboards.ca.gov/water_issues/programs/administrative_hearings_office/docs/2020_12_21_order_2020_0014_exec.pdf

https://www.waterboards.ca.gov/water_issues/programs/administrative_hearings_office/docs/2020_12_07_settlement_order_vierra.pdf